

In the Claims

The listing of claims below will replace all prior versions and listings of claims in the application:

1. (Presently Amended) A process for the fabrication of a metallic component, comprising:

providing an object having a surface;

performing a first electroforming operation, thereby forming a first metallic layer comprising metallic material on said surface;

forming a first mask layer on said first metallic layer, said first mask layer comprising a non-conductive material;

patterning said first mask layer, thereby providing a plurality of first recesses in said first mask layer from which said non-conductive material above said first metallic layer is removed, said first recesses having a dimension of elongation;

performing second electroforming operation, whereby said first recesses are filled with metallic material and a second metallic layer is formed, said second metallic layer comprising, metallic material extending at least a first predetermined thickness above and or at least partially over the surface of said first mask layer;

machining said second metallic layer to form a uniformly thick second metallic layer, said second metallic layer thereby having an upper surface;

forming a second mask layer on the upper surface of the second

metallic layer, said second mask layer comprising a non-conductive material;

patterning the second mask layer, thereby providing a plurality of second recesses in the second mask layer from which the non-conductive material above the second metallic layer is removed, said second recesses having a dimension of elongation;

performing a third electroforming operation using metallic material whereby said second recesses are filled with metallic material and a third metallic layer is formed comprising metallic material extending at least a second predetermined thickness above and at least partially over the surface of said mask layer;

machining said third metallic layer to form a uniformly thick third metallic layer, said third metallic layer thereby having an upper surface;
and

removing the object and removing the non-conductive material of the first mask layer and the second mask layer, thereby producing a metallic component having first elongate channels extending therein where the non-conductive material of the first mask layer has been removed and having second elongate channels extending therein where the non-conductive material of the first mask layer has been removed.

2. (Presently Amended) The process of claim 1, wherein the object comprises:

(A) a substrate and said surface comprises a flat or substantially flat surface of the substrate, or

(B) a shaped mandrel, the mandrel defining said surface, the surface ~~including being~~ at least one of cylindrical, conical, parabolic, hyperbolic, elliptical and spherical.

3. Canceled

4. (Presently Amended) The process of claim ~~3~~ 1, further comprising ~~including~~:

removing the object and removing the non-conductive material of the said first mask layer, thereby producing a metallic component having first elongate channels extending therein where the non-conductive material has been removed.

5-7. Canceled

8. (Presently Amended) The process of claim ~~7~~ 1, further comprising ~~wherein~~:

~~the step of patterning the first mask layer and/or the step of patterning the second mask layer are performed~~ such that:

(a) the first recesses are wider than the second recesses, or vice

versa; and/or

(b) the first elongate channels are wider than the second first elongate channels, or vice versa; and/or

(c) the first elongate channels and/or the second first elongate channels taper in width or in thickness along their respective directions of elongation; and/or

(d) the direction of elongation of the first elongate channels is at non-zero angle to that of the second first elongate channels; and/or

(e) the first elongate channels and/or the second first elongate channels are provided with projections, sidewall recesses and/or baffling, whereby non-linear flows through such channels may be achieved.

9. (Presently Amended) The process of claim 7 1, further comprising:
wherein:

~~the steps of~~ performing a first electroforming operation, forming a first mask layer, patterning the first mask layer, and performing second electroforming are performed such that the first metallic layer, the first mask layer and the second metallic layer extend over a predetermined first two-dimensional area; and

~~the steps of~~ forming a second mask layer, patterning the second mask layer and performing a third operation are performed such that the second metallic layer, the second mask layer and the third metallic layer extend over a predetermined second two-dimensional area; wherein the second two-dimensional area is larger than the first two-dimensional

area.

10. (Original) The process of claim 1, wherein the first electroforming operation is performed such that the thickness of the first metallic layer is about 100 to 200 μm .

11. (Presently Amended) The process of claim ~~3~~ 1, wherein said second electroforming operation is performed such that said predetermined thickness is at least as thick as the thickness of the first metallic layer, and said machining ~~step~~ comprises machining the second metallic layer to thickness equal to or about equal to the thickness of the first metallic layer.

12. (Original) The process of claim 1, wherein said first electroforming operation is performed for an extended period, whereby the thickness of the first metallic layer is at least as large as the thickness of the first mask layer.

13. (Original) The process of claim 1, wherein said second electroforming operation is performed for an extended period, whereby the thickness of the second metallic layer is at least as large as the thickness of the first mask layer.

14. (Presently Amended) The process of claim 1, wherein ~~the step of~~ forming a first mask layer comprises coating the first metallic layer with said non-conductive material to a thickness of 1–2 mm.

15. Canceled

16. (Presently Amended) The process of claim 1, wherein ~~the step of~~ removing the object and/or removing the non-conductive material comprises dissolving said non-conductive material in a solvent or melting said non-conductive material.

17. (Original) The process of claim 1, wherein the object is a metallic component.

18. (Original) The process of claim 1, wherein metallic material used in the electroforming is nickel, copper, cupronickel, nickel containing ceramic powder, or copper containing ceramic powder, or an alloy containing iron and/or cobalt.

19. (Original) The process of claim 18, wherein metallic material used in the second electroforming operation is different from metallic material used in the first electroforming operation, and/or metallic material used in the third electroforming operation is different from metallic material used in the second electroforming operation.

20. (Original) The process of claim 1, wherein the non-conductive material used in the steps of forming a first mask layer and/or forming a second mask layer comprises a low melting point polymer.

21-22. Previously Canceled.

23. (New) A process for fabricating a metallic component, comprising:

- providing an object having a surface;
- performing a first electroforming operation to form a first metallic layer comprising metallic material on the surface;
- forming a first mask layer of a non-conductive material on the first metallic layer;
- patterning the first mask layer to provide a plurality of first recesses therein from which said non-conductive material above said first metallic layer is removed, the first recesses having an elongate dimension;
- performing a second electroforming operation that fills the first recesses with a metallic material and that forms a second metallic layer wherein the metallic material extends at least a first predetermined thickness above or at least partially over the first mask layer surface;
- machining the second metallic layer to form a uniformly thick second metallic layer having an upper surface;
- forming a second mask layer on the upper surface of the second

metallic layer, the second mask layer comprising a non-conductive material formed by coating the second metallic layer with the non-conductive material to a thickness of 1–2 mm, or to a thickness greater than the thickness of the first mask layer;

 patterning the second mask layer to provide a plurality of second recesses in the second mask layer from which the non-conductive material above the second metallic layer is removed, the second recesses having an elongate dimension; and

 performing a third electroforming operation using metallic material whereby the second recesses are filled with metallic material, the metallic material forming a third metallic layer that extends at least a second predetermined thickness above or at least partially over the surface of said mask layer.